

Note: I am a third year law student at Harvard Law School. I have spent some time researching ISP prioritization issues in my class and clinical work during law school. The following represents the portions of my research that I believe are most relevant to the concerns of the Commission. I hope they prove useful.

Government Enforcement of Network Neutrality for p2p Applications

Network Neutrality is an assumption most Internet users take for granted. Without knowing precisely what the term means, most Internet users assume its continued existence for no other reason than that, in their experience, it has always been. They do not concern themselves with what cyberspace might look like without one of its guiding principles. But the persistence of Network Neutrality is anything but assured. If Internet Service Providers (“ISPs”) have their druthers, Network Neutrality will be a thing of the past. Because individual users are not equipped to enforce neutrality, government intervention is essential.

Network Neutrality connotes the principle by which all data packets are treated equally by Internet conduits. Because it pits powerful interests against one another, its status is fiercely contested. On one side, ISPs despise Network Neutrality because they would profit handsomely if they could prioritize data transmissions based on type, source, or recipient.¹

¹ See Kai Zhu, Note, *Bringing Neutrality to Network Neutrality*, 22

Several telecommunications executives have enucleated this view in testimony before Congress.² On the other, content providers espouse Network Neutrality because, in its absence, they would need to pay ISPs periodic prioritization fees in order to maintain web traffic.³

Network Neutrality has been the dominant principle of the ISP industry since the Internet's early proprietary networks lost out to more popular nondiscriminatory services.⁴ Contemporary Internet communication occurs via a series of protocols known as the Transmission Control Protocol/Internet Protocol, or TCP/IP.⁵ TCP/IP provides "a nearly universal interoperability that allows all end users to access Internet applications and content on a nondiscriminatory basis."⁶ Nonetheless, because ISPs retain control over the "last mile" of the Internet connection, many law and technology pundits are apprehensive about the Internet's future trajectory. In particular, they fear that ISPs will begin to charge content providers for priority transmission along the "last mile" of the connection. The result would be a discriminatory Internet in which transmissions of prioritized

² See H.R. Rep. No. 109-470, pt. 1., at 60 (2006).

³ See *id.*

⁴ See Christopher S. Yoo, Network Neutrality and the Economics of Congestion, 94 Geo. L.J. 1847, 1849 (2006).

⁵ See Christopher S. Yoo, Beyond Network Neutrality, 19 Harv. J. L. & Tech. 1, 2 (2005).

⁶ *Id.*

content would have substantial advantage over transmissions of ordinary content.

In such an Internet environment, Internet users would have difficulty connecting to ordinary content because bandwidth would be occupied by preferred transmissions. Suppose, for example, that an ISP could reach an agreement with CNN.com, a leading news website, to prioritize its content over other news websites. In that event, access to other news sites would be substantially impaired. Connection speed and load time would be slower, which would likely induce the embittered news aficionado to turn to CNN.com for the latest information. The principle of Network Neutrality prevents favoritism of this sort and ensures Internet users unlimited choice with respect to the content they view online. Without neutrality, Internet users would have fewer options in their online experience.

As some commentators have noted, there is a substantial disconnect between the characterizations of Network Neutrality on the two sides of the debate.⁷ On the one hand, Network Neutrality proponents explain the concept as one that ensures that all Internet content is delivered with equal priority. It is an issue of equality, fairness, and access. On the other hand, ISPs describe Network Neutrality as a restrictive regime that would limit

⁷ See e.g., Barbara van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, 5 J. ON TELECOMM. & HIGH TECH. L. 329, 333-34 (2007).

their ability to profit from complex infrastructure that has been assembled at great expense. In their view, Network Neutrality is fundamentally anticompetitive and, as a general policy, ought to be discarded.

In large part, the disconnect is more the result of the scope of Network Neutrality proposals than one's opinion on the merits of the concept. The narrowest definition of Network Neutrality mandates only that ISPs give equal priority to online content.⁸ Such a definition would not restrict ISPs' ability to offer tiered pricing or service levels, provided they did so equally for all content. For some Network Neutrality proponents, this level of neutrality is sufficient. More expansive Network Neutrality definitions additionally require ISPs to offer single tiered pricing, accept certain protocols, and assure interoperability.⁹ Unsurprisingly, in order to garner support for their respective causes, advocates on both sides tend to emphasize the extremism of the other side, often ignoring more moderate interpretations of the opposing position.

The ISPs have consistently maintained that Network Neutrality need not be mandatory. Rather, they claim that competition within the industry

⁸ *See id.*

⁹ *See id.*

will preserve the basic neutrality of the Internet.¹⁰ If any ISP were to block access to certain online content, the ISPs argue, consumers would rapidly terminate their service in favor of competing services that ascribe to the neutrality principle. Indeed, there is reason to think that such claims have some merit.

To some degree, the ISPs are correct. Discriminatory Internet service is not problematic of its own accord. If an ISP, or even several ISPs, were to provide discriminatory Internet service in a freely competitive market, no crisis would result. Indeed, the market for Internet service might be improved. Consumer choice would expand as Internet users could choose tiered service or neutral service. The vast majority would be expected to choose neutral service, but the choice, if fairly presented, does not pose any legal or policy problems. The problem arises from the fact that Internet service is a small industry that is getting even smaller. In many areas, there are only two options for Internet service: the cable company or the phone company. If both providers were to offer only discriminatory Internet service, the neutrality of the Internet would disappear. It would still exist technically, but no one would be able to access it. A rash of high-profile

¹⁰ Amy Schatz & Anne Marie Squeo, *As Web Providers' Clout Grows, Fears Over Access Take Focus: FCC's Ruling Fuels Debate Between Broadband Firms and Producers of Content*, WALL ST. J., Aug. 8, 2005, at A1.

telecommunications mergers have only served to exacerbate fears of discriminatory Internet service.¹¹

Bandwidth is something of a limited commodity. It can be increased, but only at substantial cost. Thus, if ISPs can manage bandwidth more efficiently, they may not need to engage in expensive infrastructure upgrades. Enter Quality of Service (“QOS”) Prioritization. QOS Prioritization is a form of discriminatory Internet service that prioritizes time sensitive transmissions such as VOIP phone service, videoconferencing, and streaming media, and downgrades lower priority transmissions like websites or e-mail. The QOS defense has also been used to justify prioritizing low bandwidth transmissions over high bandwidth transmissions. Such metering

¹¹ See FCC Approves Merger of AT&T Inc. and BellSouth Corporation, News Release (Dec. 29, 2006), available at <http://hraunfoss.fcc.gov/edocs/public/attachmatch/DOC-269275A1.pdf>; Verizon Communications Inc. and MCI, Inc., Applications for Approval of Transfer of Control, WC Docket No. 05-75, Memorandum Opinion and Order, 20 F.C.C. Rcd. '8433 (2005); Applications of Nextel Communications, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations, WT Docket No. 05-63, Memorandum Opinion and Order, 20 F.C.C. Rcd 13967 (2005); SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control, WC Docket No. 05-65 Memorandum Opinion and Order, 20 FCC Rcd 18290 (2005).

technologies, which were not widely available as little as one year ago,¹² are becoming more prevalent.¹³

In 2001, Mark Lemley and Larry Lessig noted that the dreaded risks of a discriminatory Internet “have not yet come to pass.”¹⁴ Yet recent events have brought the Network Neutrality debate to a boiling point. Because of ever increasing demand for bandwidth, ISPs have sought better ways to manage their limited bandwidth. In particular, ISPs have sought to de-neutralize their services by employing price discrimination and tiered service

¹² Rob Frieden, *Network Neutrality or Bias? - Handicapping the Odds for a Tiered and Branded Internet*, 29 HASTINGS COMM. & ENT. L.J. 171, 179 (2007).

¹³ In its Operator Acceptable Use Policy, Time Warner gives some insight into its approach to prioritization. The policy explains that Time Warner Cable “may use various tools and techniques in order to efficiently manage its networks and to ensure compliance with its Acceptable Use Policy.” Operator Acceptable Use Policy, http://help.twcable.com/html/twc_misp_aup.html (last visited Jan. 9, 2008). Such tools may include “limiting the number of peer-to-peer sessions a user may conduct at one time” and “limiting the aggregate bandwidth available for certain usage protocols such as peer-to-peer and newsgroups.” *Id.*

¹⁴ Mark A. Lemley & Lawrence Lessig, 48 UCLA L. Rev. 925, 955 (2001).

of bandwidth and content.¹⁵ For example, William L. Smith, the Chief Technology Officer of Bell South (which has since merged with AT&T), has argued that ISPs should be able to charge online content providers for faster transmission to Internet users.¹⁶ In response to such efforts, Network Neutrality advocates vehemently criticized ISPs and sought ways to restrict their ability to offer non-neutral Internet services.¹⁷ The major Democratic presidential candidates have all endorsed Network Neutrality.¹⁸

Recent Issues with ISP Prioritization Techniques

Most telecomm and cable companies do not publicly provide information regarding their prioritization techniques. Time Warner Cable is one of the most forthright companies in this respect. In its Operator Acceptable Use Policy, the company gives some insight into its approach to prioritization. The policy explains that Time Warner Cable “may use various tools and techniques in order to efficiently manage its networks and to ensure

¹⁵ *See* Yoo, *supra* note 4, at 1849.

¹⁶ *See* Charles Babington, Neutrality On the Net Gets High '08 Profile, Wash. Post, Feb. 20, 2007, at D01.

¹⁷ *See* LAWRENCE LESSIG, THE FUTURE OF IDEAS 147-76 (2002); Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. ON TELECOMM. & HIGH TECH L. 141, 165 (2003).

¹⁸ *See* Babington, *supra* note 16.

compliance with its Acceptable Use Policy.”¹⁹ Such tools may include “limiting the number of peer-to-peer sessions a user may conduct at one time” and “limiting the aggregate bandwidth available for certain usage protocols such as peer-to-peer and newsgroups.”²⁰ These statements indicate that Time Warner gives p2p applications low priority relative to other types of data packets.

By way of contrast, other ISPs offer even less information. Verizon promises prospective high-speed Internet service subscribers “a dedicated connection to the Verizon central office so that you don’t have to share your local access connection with other users.”²¹ Nonetheless, Verizon acknowledges that upstream congestion may hinder connection speed.²² Verizon also gives the vague explanation that “other factors” may influence connection speed.²³ An analogous set of representations appears in relation

¹⁹ Operator Acceptable Use Policy,
http://help.twcable.com/html/twc_misp_aup.html

(last visited Jan. 9, 2008).

²⁰ *Id.*

²¹ Verizon,

<http://www22.verizon.com/content/consumerdsl/faqs/all+faqs/all+faqs.htm>

(last visited Jan. 10, 2008).

²² *Id.*

²³ *Id.*

to FIOS, Verizon's fiber optic broadband Internet service.²⁴ AT&T does not admit to any degree of prioritization. The AT&T website cites only "heavy Internet traffic, the condition of your telephone lines, and the distance of your home to the telephone company's central switching station" as factors that may affect download speed.²⁵ Earthlink's disclosures closely mirror those of AT&T.²⁶

It is common practice for ISPs to bundle the traffic of a group of users through concentrator routers in which the outgoing bundle only has a fraction of the total subscriber bandwidth.²⁷ Bundles may accumulate and cause upstream congestion in the routers when a number of subscribers use bandwidth that approaches their subscribed maximum. This process, known as overbooking because all subscribers cannot utilize their maximum available bandwidth simultaneously, supplies the impetus for prioritization. In situations of high congestion in which much of the broadband traffic is low

²⁴ See Verizon, <http://www22.verizon.com/content/consumerfios/faqs/faqs.htm> (last visited Jan. 10, 2008).

²⁵ See AT&T, http://www.usa.att.com/dsl/faqs.jsp#affect_speed (last visited Jan. 10, 2008).

²⁶ See Earthlink, http://www.earthlink.net/highspeed/faq/#s_affects (last visited Jan. 10, 2008).

²⁷ See Posting of Ed Felton to Freedom to Tinker, <http://www.freedom-to-tinker.com/?p=1028> (June 14, 2006, 6:25 EST).

priority data, ISPs have much to gain from prioritizing time sensitive transmissions.²⁸

Priority is granted on technical grounds.²⁹ For example, streaming video and VOIP audio get priority over p2p and spam because of the urgency of the transmission. Such high priority transmissions are tagged with prioritization flags that accelerate their transmission ahead of lower priority data streams.³⁰ Thus, prioritization of some packets over others means a longer wait for non-prioritized packets when the network is congested.³¹ Routers with sophisticated prioritization systems will require more transistors, and consequently will be more expensive, than routers that simply transmit packets on a first-come, first-served basis.³² Nonetheless, buffering and

²⁸ *See id.*

²⁹ *See id.*

³⁰ *See* Posting of Tim Lee to The Technology Liberation Front, <http://www.techliberation.com/archives/042005.php> (Feb. 8, 2007, 11:24 EST).

³¹ *See* Center for Democracy & Technology, REPLY COMMENTS BEFORE THE FEDERAL COMMUNICATIONS COMMISSIONS IN THE MATTER OF BROADBAND INDUSTRY PRACTICES at 6 (July 16, 2007), <http://www.cdt.org/speech/20070716fcc-comments.pdf>.

³² *See* Lee, *supra* note 30.

emptying a real time queue first and a best effort queue second will allow real-time traffic to continue to operate effectively during peak utilization.³³

Thus, “QOS” helps ISPs make efficient use of finite amounts of bandwidth.³⁴ When QOS prioritization is employed without noticeable delay to low priority transmissions, both ISP and consumer benefit. However, if delay to low priority transmissions becomes noticeable, some consumers will become frustrated and seek out alternative ISPs. As a result, any ISP engaging in QOS prioritization still needs to monitor network usage and invest in bandwidth upgrades when necessary.³⁵

At present, ISPs do not regularly prioritize based on content.³⁶ Nevertheless, ISPs have fought to preserve their ability to do so in the future.³⁷ In particular, they have sought to preserve the ability to charge content and application providers for high priority transmission to subscribers.³⁸ Based on these efforts, the Center for Democracy and Technology, a non-profit advocacy group, has warned the FCC that “there may be a real eventual

³³ *See id.*

³⁴ *See id.*

³⁵ *See id.*

³⁶ *See* Center for Democracy & Technology, *supra* note 31, at 2.

³⁷ *See id.*

³⁸ *See id.*

prospect of preferential treatment of selected traffic based on commercial deals between network operators and applications providers.”³⁹

Legislative and Administrative Approaches to Network Neutrality

Unsurprisingly then, recent years have also seen a series of legislative approaches to the Network Neutrality dilemma. In 2006, the House of Representatives passed a telecommunications reform bill that included only weak Network Neutrality requirements.⁴⁰ In the process, the House rejected an amendment that would have mandated Network Neutrality.⁴¹ A similar Network Neutrality amendment was proposed as an addition to Senator Stevens’ Telecommunications Reform Bill.⁴² As with the House bill, the Network Neutrality amendment was ultimately excluded from the Senate bill.⁴³

In the absence of a federal statute, the Federal Communication Commission’s (“FCC”) policies on Network Neutrality control. The FCC has

³⁹ *See id.* at 3.

⁴⁰ See H.R. Res. 5252, 109th Cong. § 201 (2006).

⁴¹ Marilyn Geewax, *Network Neutrality’ Supporters Vow Fight*, ATLANTA JOURNAL-CONSTITUTION, June 10, 2006, at 3F.

⁴² Bill D. Herman, *Opening Bottlenecks: On Behalf of Mandated Network Neutrality*, 59 FED. COMM. L.J. 103, 105-06 (2006).

⁴³ *See* S. 2686, 109th Cong. (2006).

decided to endorse Network Neutrality.⁴⁴ In 2002, the FCC determined that the Internet was an “information system” and therefore within its mandate under the Telecommunications Act of 1996.⁴⁵ The Ninth Circuit disagreed, finding the Internet to be “part ‘telecommunications service’ and part ‘information system.’”⁴⁶ The Ninth Circuit’s holding brought the FCC’s actions on Net Neutrality to an abrupt halt.⁴⁷ However, the Supreme Court granted certiorari and reversed, recognizing the FCC’s authority over the interpretation of “telecommunication service” and, accordingly, over Network Neutrality .⁴⁸

The FCC’s decision that Network Neutrality was within its jurisdiction was a prerequisite to its decision to adopt a set of four fundamental “Internet

⁴⁴ See *Appropriate Framework for Broadband Access to the Internet over Wireless Facilities*, Policy Statement, 20 F.C.C.R. 14986 (2005).

⁴⁵ See *Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities*, Declaratory Ruling and Notice of Proposed Rulemaking, 17 F.C.C.R. 4798 (2002); *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Notice of Proposed Rulemaking, 17 F.C.C.R. 3019 (2002).

⁴⁶ See *Brand X Internet Servs. v. FCC*, 345 F.3d 1120 (9th Cir. 2003).

⁴⁷ See Yoo, *supra* note 5, at 2 n.1.

⁴⁸ See *Nat’l Cable & Telecomms. v. Brand X Internet Servs.*, 545 U.S. 967 (2005).

Freedoms.” The basic notion of Internet Freedoms was first suggested by Craig Mundie of Microsoft in 2002.⁴⁹ Chairman Michael Powell’s decision to adopt the “Internet Freedoms” placed the FCC firmly within the Network Neutrality camp by requiring ISPs to respect and maintain the end-to-end functionality of the Internet. Powell also resolved that the FCC would take action to enforce the neutrality principles embodied in the “Internet Freedoms.”⁵⁰

The adoption of the “Internet Freedoms” was not intended as a mere policy statement or recommendation. On the contrary, Powell and the FCC were serious about promoting Network Neutrality. In an FCC administrative proceeding, *In the Matter of Madison River Communications*,⁵¹ the FCC’s Enforcement Bureau investigated Madison River Communications for allegedly blocking ports used for VOIP applications.⁵² The practice hampered subscribers’ ability to use certain VOIP services.⁵³ The FCC believed the

⁴⁹ Lawrence Lessig, *Testimony of Lawrence Lessig at the Senate Committee on Commerce, Science, and Transportation Hearing on “Network Neutrality,”*

3 INFO. SOC’Y J.L. & POL’Y 185, 186 (2007).

⁵⁰ *Id.*

⁵¹ 20 F.C.C. Rcd 4295 (2005).

⁵² *Id.* at * 4.

⁵³ *Id.*

practice violated section 201(B) of the Communications Act of 1934.⁵⁴ The parties agreed to a Consent Decree, which was signed by David H. Solomon, Chief of the Enforcement Bureau, and thereby adopted by the FCC.⁵⁵ The Consent Decree prohibited the blocking of ports used for VOIP applications.⁵⁶ It also barred Madison River from “otherwise prevent[ing] customers from using VOIP applications.”⁵⁷ More importantly, it put ISPs on notice that discriminatory interference with Internet transmissions would not be tolerated.⁵⁸

The Theory of Generativity

Network Neutrality is primarily an issue of individual freedom and fair competition, but it is also an issue of innovation. The theory of the Internet’s generativity is founded upon its neutrality.⁵⁹ In its simplest incarnation, the theory of generativity can be broken down into three components. First, the primary benefit of the Internet and the PC is generativity, which is the ability “to produce unanticipated change through

⁵⁴ *Id.*

⁵⁵ *Id.* at * 2.

⁵⁶ *Id.* at * 5-6.

⁵⁷ *Id.*

⁵⁸ *See* Lessig, *supra* note 49, at 186.

⁵⁹ *See* Jonathan Zittrain, THE FUTURE OF THE INTERNET AND HOW TO STOP IT

(forthcoming 2008).

unfiltered contributions from broad and varied audiences.”⁶⁰ Second, the generative aspects of the Internet and PC are entirely contingent. They have arisen through a series of historical accidents, but could easily be reduced or even eliminated by firms or governments. Third, the dangers of generativity give rise to increasing pressure to applicancize both the Internet and the PC.⁶¹ These pressures should be resisted because the resulting loss in generativity and increase in regulability outweigh the short-term benefits of appliancization.

The first two parts of the theory indicate that Network Neutrality is vital to innovation on the Internet. Note the need for “unfiltered contributions from broad and varied audiences.”⁶² Without Network Neutrality, such contributions would be non-existent. A non-neutral Internet divides cyberspace into producers and consumers, making it difficult for individuals to occupy both roles. A neutral Internet, on the other hand, promotes “unfiltered contributions from broad and varied audiences”⁶³ because audience members can rapidly become producers. The second prong of the generativity theory emphasizes the high stakes. The Internet’s innovative character, Zittrain argues, can be reversed by undoing its basic

⁶⁰ *Id.* at 2.

⁶¹ *Id.* at 6.

⁶² *Id.* at 2.

⁶³ *Id.*

characteristics. Many of the Network Neutrality advocacy groups such as Save the Internet, share Zittrain's concern.⁶⁴

The final prong of the generativity theory deals with the harmful effects of applanization. Applanization occurs when the generative capabilities of computers or the Internet are limited.⁶⁵ The absence of Network Neutrality would be an instance of applanization because users would be channeled to mainstream sites by the faster download speeds. As a result, there would be less opportunity for people to generate and promote their own content. Because the Internet's generativity is one of its most distinctive characteristics, it should be preserved by resisting the impulse to applanize the Internet.

Government Enforcement of Network Neutrality Principles

If certain Internet transmissions are prioritized over others, why not leave enforcement actions to the senders and recipients of de-prioritized transmissions? After all, they are in the best position to recognize and identify de-prioritized transmissions. Perhaps they are also best suited to bring Network Neutrality enforcement actions.

But if we turn to the news example and assume that CNN.com paid for priority transmission to Internet users, competing news sites like Reuters.com

⁶⁴ See e.g., Save the Internet, www.savetheinternet.com (last visited Jan. 27, 2008).

⁶⁵ See *id.* at 6.

or AP.org would lose Internet traffic. The competing sites could be expected to search for the source of their decreased traffic and thereby ascertain that their content is being transmitted at a slower rate than that of CNN.com. Understandably concerned, they could also be expected to take legal action to prevent discriminatory transmission of this sort.

At first glance, the system looks tidy. The harmed parties bring the matter to the attention of the authorities, who rectify the wrongdoing. Plaintiffs could seek attorney's fees and costs to cover their expenses, thereby placing the entire cost of the matter on the offending parties. The problem is that most Network Neutrality debates will not be between sophisticated parties like CNN and Reuters. Indeed, competing services may be more likely match CNN.com by paying for prioritized service than they are to bring an action to prevent such conduct. Rather, Network Neutrality disputes are most likely to occur between parties with disproportionate resources. As one set of commentators has remarked, Network Neutrality battles are likely to be waged "between the newly defined classes of haves and have-nots."⁶⁶ The independent blogger is unlikely to be able to enforce his rights against a sophisticated ISP that is prioritizing alternative content. For that reason,

⁶⁶ Amit M. Shejter and Moran Yemini, *Justice, and Only Justice, You Shall Pursue: Network Neutrality, the First Amendment and John Rawls's Theory of Justice*, 14 MICH. TELECOMM. TECH. L. REV. 137, 139 (2007).

government enforcement is an essential component of maintaining Network Neutrality where it matters most.

In sum, Network Neutrality is something people should be worried about. Without it, the Internet takes on a very different character. Most experts not working for an ISP agree that Network Neutrality is beneficial. It provides equitable transmissions among providers and offers users complete freedom as to the content they view online. Yet Network Neutrality is not going to enforce itself. Because substantial profits are at stake, ISPs will push the limits of acceptable behavior. In such an environment, government enforcement is indispensable.